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**THE EFFECT OF DENTAL HEALTH EDUCATION USING MUSIC IN
 DECREASING PLAQUE INDEX OF INTELLECTUALLY DISABLED**

Shaula Chintyasari¹, Isnur Hatta², I Wayan Arya Krishnawan Firdaus³

¹Dentistry Faculty, Lambung Mangkurat University, Banjarmasin

²Public Dental Health Department, Dentistry Faculty, Lambung Mangkurat University, Banjarmasin

³Oral Biology Department, Dentistry Faculty, Lambung Mangkurat University, Banjarmasin

ABSTRACT

Background: Intellectually disabled (ID) children refer to special needs children whose intelligences are below the average. Poor dental and oral health conditions are a problem that is often found in ID children. Dental health education (DHE) on toothbrushing activity for ID children can be a solution for their dental and oral health problems, however ID children have limitation in receiving information caused by the deficit of cognitive functions covering perception, memory, idea development, evaluation, and reasoning. Effective learning processes in DHE for ID children can be achieved by using adaptive media like music adjusted to the condition of ID children. **Objective:** To analyze the effect of DHE using music in decreasing plaque index of mild-to-moderate ID children. **Methods:** Pre-experimental (one-group pre and posttest) and total sampling method were used. Thirty subjects, junior high school students with mild-to-moderate intellectual disability (9 females and 21 males), were given 15 sessions of DHE using music as adaptive media. The music was in the form of children's song, which contains stages of tooth-brushing using modified-bass technique, created specifically by adjusting to characteristics of ID children. Plaque index was measured using Quigley–Hein Turesky–Gilmore–Glickman modification on day-0, 3, 6, 9, 12, and 15. **Results:** Average plaque index of all subjects (mean±SD): pretest (4.79±0.27), posttest-1 (4.37±0.36), posttest-2 (4.02±0.42), posttest-3 (3.39±0.46), posttest-4 (2.78±0.65), posttest-5 (2.29±0.86), Wilcoxon statistical analysis showed that there are significant differences ($p < 0,05$). **Conclusion:** DHE using music as adaptive media in the form of children's songs can affect the reduction in plaque index of mild-to-moderate ID children since the 3rd day. The decrease in male subjects' plaque index was slower than in female subjects. Grade level does not affect the decrease in plaque index of ID children. Lingual surface's plaque index had higher score with slower decline than buccal surface.

Keywords: Dental health education, intellectual disability, music, plaque index, tooth-brushing.

Correspondence: Shaula Chintyasari, Dentistry Faculty, Lambung Mangkurat University, Jl. Veteran 128B, Banjarmasin 70249, South Kalimantan, Indonesia; Email: shaulachintya@gmail.com

INTRODUCTION

Intellectually disabled children refer to the children with special needs whose intelligences are below the average.¹ The population of intellectually disabled children occupies the biggest number compared to the number of other children with disabilities. The number of intellectually disabled children in Indonesia is estimated 2.3% from the total population with the classifications of 85% mild intellectually disabled, 10% moderate intellectually disabled, 4% severe intellectually disabled, and 1-2% profound intellectually disabled, and the ratio of 60% males and 40% females or 3:2.¹ Intellectually disabled children lack in their intelligence, adaptive, social and practice functions.²

Poor dental and oral health conditions are a problem that is often found in intellectually disabled

children due to children inability to brush their teeth independently because of their intellectual and adaptive function disability.³ The problems of dental and oral health often suffered by intellectually disabled children are periodontal disease, caries, and malocclusion, with a higher prevalence compared to normal individual.⁴

Dental and periodontal diseases are able to be prevented by eliminating one of the main factors such as dental plaque. Dental plaque is one of the most common causes of dental and oral disease in children.⁵ Dental plaques are soft deposits that contain bacteria and their products, which form on all tooth surfaces. Plaques and carbohydrates that attach to teeth require a certain minimum amount of time to form acids that are capable of causing email demineralization. Dental plaque cannot be cleaned

only by gargling or spraying water, dental plaque can only be cleaned thoroughly by mechanical means. Mechanical actions to remove dental plaque commonly used is toothbrushing activity.⁷ Research by Patil *et al*, 2014 shows that the modified Bass method is the most effective tooth brushing method for children respondents.⁸

Dental health education on toothbrushing activity for intellectually disabled children can be a solution for their dental and oral health problems, however as their intelligence is under the average compared to the normal ones make intellectually disabled children have limitation in receiving information caused by the deficit of cognitive functions covering perception, memory, idea development, evaluation, and reasoning.¹ Effective learning processes in dental health education for intellectually disabled children can be achieved by using adaptive media like music or props adjusted to the condition of intellectually disabled children.⁹ Music is known to be able to create a pleasant atmosphere, stimulates thinking, improves concentration and memory, while influencing cognitive processes. Music elements such as rhythm, beats, and harmony affect human physiology, especially brain waves and heart rate in addition to fostering enthusiasm and increasing focus.¹⁰

Previous research by Perwidananta, 2016 did not measure the plaque index but only focused on increasing the ability of toothbrushing by delivering information on how to brush teeth targeted at 14 mild to moderate intellectually disabled children, using children's songs and dental model as an additional props on the explanation of teeth area that should be brushed which was then continued with the demonstration of toothbrushing independently. The Wilcoxon test results showed $p = 0.001$ ($p < 0.05$), which means that there was a significant difference between data before and after counseling, since day 15.¹¹ This study aimed to analyze the effect of dental health education (DHE) using music in decreasing plaque index of mild to moderate intellectually disabled children.

RESEARCH METHODS

This research has received research ethics permission with number 104/KEPKG-FKGULM/EC/I/2019 issued by the Health Research ethics committee of Dentistry Faculty, Lambung Mangkurat University. This study used pre-experimental design with one group pretest and posttest design. The population in this study were 34 respondents covering junior high school students of mild to moderate intellectually disabled children at SLB-C Negeri Pembina South Kalimantan. The sampling technique was done by using total sampling. The study was conducted on 30 respondents since 4 other respondents did not meet the criteria of inclusion and exclusion. Respondents consisted of 9 females and 21 males. A total of 16

respondents were 7th grade students, 7 respondents were 8th grade students, and 7 other respondents were 9th grade students.

Respondents were first given an explanation of the research procedure and gave their approval in the form of informed consent. Pretest data were obtained through the measurement of Quigley–Hein plaque index modified by Turesky–Gilmore–Glickman (1962) on respondents before dental health education using music was conducted. Dental health education using music on respondents was given to the respondents as many as 15 meeting which were divided into three stages covering demonstration, simulation, and direct action. Posttest data were obtained through the measurement of Quigley–Hein plaque index modified by Turesky–Gilmore–Glickman (1962) on respondents after dental health education using music was conducted on the 3rd, 6th, 9th, 12th, and 15th day.

Song Creation Procedure

The song used in this study is entitled "Ayo Sikat Gigi!" composed as the adaptive learning media for dental health education using music on mild to moderate intellectually disabled children who became respondents. The process of creating this song involved two music academics who have stated their willingness to collaborate. Collaboration was conducted in order to make the process of music forms analyzing and musical compositions making for this study ran optimally.

The elements of music contained in the song "Ayo Sikat Gigi!" had been made by adjusting to the conditions of intellectually disabled so that in this research, it could be used as the dental health education media for intellectually disabled children. The adjusted music elements include lyrics, melody, harmony and tempo of the song.

Lyrics: The song "Ayo Sikat Gigi!" contains persuasive lyrics and the stages of toothbrushing with the modified bass method that is arranged systematically, considering that intellectually disabled children will have difficulty understanding things that are not arranged in order.¹ They have adversity to think abstractly, weak in reasoning, and difficult to develop ideas, therefore learning material should be concrete and easy to understand.¹ The inability of intellectually disabled children in receiving learning material also became the researcher's consideration in creating song lyric containing the instruction with understandable language. Some parts of the lyrics are repetitive in order to help intellectually disabled children who have short-term memory weaknesses, to remember the lyrics and understand the message within the lyric.

Melody: The melody contains elements of tone interval and rhythm. In the song "Ayo Sikat Gigi!", the widest tone interval used is the Quint interval (five-tone distance). The rhythm

arrangement in this song uses more notes of 1/4 and 1/8 tones, this was intended so that the melody can be easily absorbed by intellectually disabled children.

Harmony: The harmony/chord used in the song "Ayo Sikat Gigi!" is a major chord, because a major chord are able to give a pleasant atmosphere into a song, so the use of this song in dental health education process for intellectually disabled children can awaken a cheerful atmosphere and attract their attention to overcome the basic characteristics of intellectually disabled children that generally have attention disorders.¹

Tempo: Tempo used in the song "Ayo Sikat Gigi!" is moderato, tempo with medium speed ranging from 100-110 bpm. The use of tempo moderato is expected to provide an atmosphere of enthusiasm in the dental health education process for intellectually disabled children. The partiture of the song "Ayo Sikat Gigi!" can be seen in the following figure:

AYO SIKAT GIGI

Voice

By Shaula Chintyasari
and Benny Mahendra

Moderato

Figure 1. "Ayo Sikat Gigi!" song partiture

Plaque Index Measurement Procedure

The measurement of plaque index began by coating the entire tooth surface with disclosing gel, then the respondent was asked to gargle so that the excess disclosing material was rinsed. Plaque accumulation was assessed by using the Quigley–Hein plaque index modified by Turesky–Gilmore–Glickman (1962) with calculation scale, 0= no plaque; 1= there

are separate plaque spots on the cervical region of the tooth and other parts above the tooth's cervical; 2= a thin layer of continuous plaque approximately 1 mm, in the cervical area of the tooth; 3= a layer of plaque with a width of more than 1 mm and covering less than 1/3 of the tooth's crown; 4= plaque covers between 1/3–2/3 parts of the tooth's crown; 5= plaque covers more than 2/3 part of the tooth's crown. The tooth selection based on Ramford's Periodontal Disease Index (PDI), were teeth 16, 21, 24, 36, 41, 44. If the teeth are not present, they can be replaced with teeth that had similar anatomical forms in one sextant. The tooth surfaces observed included six surfaces: mesiofacial, midfacial, distofacial, mesiolingual/mesiopalatal, midlingual/midpalatal, and distolingual/distopalatal on each examined tooth. The plaque index of each respondent was calculated by dividing the number of plaque scores obtained by the number of teeth examined.

Dental Health Education Using Music Procedure

Dental health education using music was conducted in three stages of learning process including demonstration, simulation, and direct action stages. At the demonstration stage, the respondent were shown the process of toothbrushing that was exhibited on a dental model (phantom) by a demonstrator accompanied by the song "Ayo Sikat Gigi!" which was sung directly. Furthermore, the simulation stage trained the respondents to imitate the process of toothbrushing that had been taught on a dental model (phantom) while singing the song "Ayo Sikat Gigi!". After that, respondents practiced to brush their teeth directly, based on the stages they had learned through the song "Ayo Sikat Gigi!".

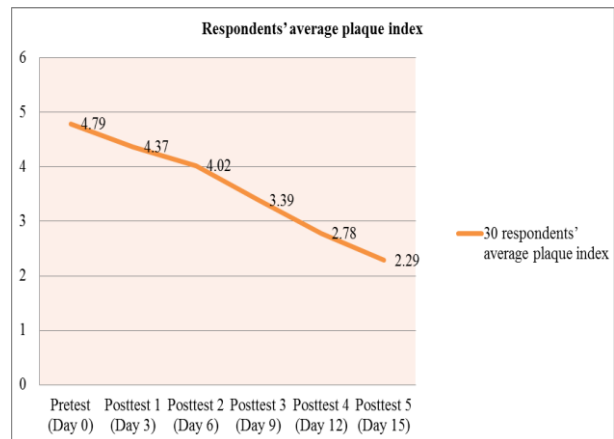
RESULTS

The results of plaque index examination on 30 respondents in the form of a mean and standard deviation (SD) can be seen in the table below:

Table 1. The results of modified Quigley–Hein plaque index examination on 30 respondents

	Pretest	Posttest 1	Posttest 2
All respondents	4,79±0,27	4,37±0,36	4,02±0,42
		Posttest 3	Posttest 4
		3,39±0,46	2,78±0,65
		Posttest 5	2,29±0,86
Divided by sexes			
Male	Pretest	Posttest 1	Posttest 2
	4.87±0,13	4.5±0,23	4.17±0,34
		Posttest 3	Posttest 4
		3.52±0,51	2.92±0,69
Female	Pretest	Posttest 1	Posttest 2
	4.59±0,35	4.07±0,46	3.66±0,42
		Posttest 3	Posttest 4
		3.08±0,41	2.45±0,51
	Posttest 5	1.92±0,72	
Divided by grade levels			
7th grade	Pretest	Posttest 1	Posttest 2
	4.82±0,26	4.46±0,30	4.04±0,37
		Posttest 3	Posttest 4
		3.45±0,47	2.77±0,57
8th grade	Pretest	Posttest 1	Posttest 2
	4.75±0,33	4.35±0,53	3.98±0,53
		Posttest 3	Posttest 4
		3.19±0,35	2.67±0,75
9th grade	Pretest	Posttest 1	Posttest 2
	4.75±0,24	4.19±0,26	4±0,49
		Posttest 3	Posttest 4
		3.44±0,56	2.93±0,77
	Posttest 5	2.61±1,17	
Divided by tooth surfaces			
Buccal	Pretest	Posttest 1	Posttest 2
	4.67	4.19	3.83
		Posttest 3	Posttest 4
		3.15	2.5
Lingual	Pretest	Posttest 1	Posttest 2
	4.83	4.55	4.18
		Posttest 3	Posttest 4
		3.63	3.06
	Posttest 5	2.59	

Based on table 1, it can be seen that the respondent's plaque index decreased after being given dental health education using music. The average examination results of female respondent's plaque index were lower than the average examination results of male respondent's plaque index. The plaque index score of 9th grade respondent group had significant difference in the results of the 4th and 5th posttest compared to the other two groups. The average dental plaque index examination results on buccal surface was lower than the average dental plaque index examination results on lingual surface. The average decline of respondents' plaque index in the form of line graph can be seen on the following figure:

**Figure 2.** Respondents' average plaque index

Based on the results of normality test using Shapiro-Wilk, the difference of plaque index on pretest-posttest 1 ($p=0.037$), pretest-posttest 2 ($p=0.709$), pretest-posttest 3 ($p=0.048$), pretest-posttest 4 ($p=0.004$), and pretest-posttest 5 ($p=0.001$) obtained pretest-posttest 2 was the only datum which reached a significance value > 0.05 . It means that the datum was normally distributed, while the other 4 data groups had a significance value < 0.05 which means the data were not normally distributed, thus it can be concluded that the majority of plaque index data in this study were not normally distributed. Data that were not normally distributed can acquire hypothesis testing through Wilcoxon non-parametric statistical analysis.

Based on the result of Wilcoxon test, sig. values of pretest-posttest 1 ($p=0.001$), pretest-posttest 2 ($p=0.001$), pretest-posttest 3 ($p=0.001$), pretest-posttest 4 ($p=0.001$), and pretest-posttest 5 ($p=0.001$) were obtained as it meant that the significance value of the entire data group was < 0.05 , then H_0 was rejected and H_1 was accepted. The hypothesis in this study was accepted, there was an effect of dental health education using music in decreasing plaque index of mild to moderate intellectually disabled children. The effect was able to be seen in the result of the first posttest conducted after dental health education using music being implemented for 3 days.

Based on the results of Mann–Whitney test for plaque index data by sex, the sig. values of plaque index comparison on male respondents with female respondents through pretest examination ($p=0.025$), posttest 1 ($p=0.014$), posttest 2 ($p=0.003$), posttest 3 ($p=0.009$), posttest 4 ($p=0.019$) and posttest 5 ($p=0.019$) were acquired. This can be interpreted as significant differences between the plaque index data of male respondents and female respondents in all examination data because the significance value was < 0.05 .

Based on the results of Kruskal–Wallis test for plaque index data based on grade level, the sig. values of plaque index comparison on 7th grade, 8th

grade, and 9th grade respondents on pretest examination ($p=0.650$), posttest 1 ($p=0.136$), posttest 2 ($p=0.987$), posttest 3 ($p=0.511$), posttest 4 ($p=0.802$), and posttest 5 ($p=0.588$) were acquired. This can be interpreted that there was no significant difference between plaque index of 7th grade, 8th grade, and 9th grade respondents group on all examination data because the significance value was > 0.05 .

DISCUSSION

Pretest's Plaque Index Examination Results

Plaque index data of 30 respondents on pretest examination showed an average of 4.79. A high plaque index score as in this study can be caused by poor dental and oral health conditions which are a problem that is often found in intellectually disabled children, it is due to children's inability to brush their teeth independently because of impaired intellectual and adaptive functions.

The average plaque index on pretest examination divided by sex group had a significant difference ($p < 0.05$) with the plaque index score of male respondents group was higher than female respondents', while the average plaque index on pretest examination divided by grade level group did not have a significant difference ($p > 0.05$). Some studies reported a correlation between sex differences with oral and dental hygiene.

Respondents with mild to moderate intellectual disability in this study were spreaded across the three grade level groups, but the presence of two moderate intellectually disabled respondents who had a communication process disorder was only found in the male respondents group. The ability of intellectually disabled children is different from one another depending on their intelligence level.¹ It can explain the significant difference of pretest scores between sexes and the non-significant difference of pretest score between grade levels.

Posttest's Plaque Index Examination Results

The respondent's plaque index score decreased after dental health education using music was conducted. Posttest 2 examination (6th day) showed the smallest plaque index's decline, while the largest decline was found in posttest 3 (9th day). It happened as the researcher replaced the toothbrushes used by respondents from day 6, from medium bristle and adults' brush head size to soft bristle and smaller brush head size. Previous study reported the use of toothbrushes with small head sizes was considered more effective in cleaning plaque. Toothbrushes with soft bristles can help reduce the plaque index because it is rarely associated with trauma, making respondents more comfortable directing it to the gingival sulcus with less pain, gingival lacerations, and cervical abrasion.¹²

Respondent's plaque index data in this study also showed that after dental health education using music was conducted, lingual surface had a higher plaque index score with a slower process of decline compared to the buccal surface of the six teeth examined (16, 21, 24, 36, 41, 44). In general, the lingual surface of tooth is considered as the most difficult part to clean. This can be related to 75% of saliva production in oral cavity originating from the submandibular gland (65–70%) and sublingual gland (5%) which project its secretion through the wharton duct (submandibularis), bartholini duct (sublingualis), and rivinus duct (sublingualis) which is located under the tongue (lingua), precisely in the plica sublingualis (wharton and bartholini) and sublingualis caruncules (rivinus).¹³

Exposure to saliva on oral cavity's surface will form salivary pellicle which is a thin layer of acellular organic. Salivary pellicles are formed from glycoproteins including proline-rich proteins (PRP) which played a role in bacterial adhesion.¹⁴ Bacteria that attached to salivary pellicles on the tooth surface proliferate and form micro colonies that are able to secrete protective layers, then biofilms are formed after micro colonies got more complex until it finally reached the process of maturation and has its own primitive circulation system. Bacterial adhesion to salivary pellicles marks the process of plaque formation; bacteria at this stage are able to survive on the tooth's surface even though they faced the mechanical shear stress from the salivary flow and movement of the tongue.¹⁵

Streptococcus mutans, *Streptococcus sobrinus*, *Streptococcus gordonii*, *Streptococcus oralis*, and *Streptococcus intermedius* use adhesin antigen I / II family to bind to the parotid salivary agglutinin (SAG) substrate, salivary glycoprotein, proline-rich proteins, and collagen. While *Streptococcus gordonii* bacteria are also using adhesin in the form of complex antigens to be able to bind specifically to the 73-kDa submandibular salivary protein substrate.¹⁶ Plaque formation with stages of bacterial adhesion to specific salivary pellicle substrates derived from saliva produced by submandibular can be one of the factors that explain high plaque index scores on the lingual surface of the teeth.

The lyrics of the song "Ayo Sikat Gigi!" used in this study can also be a factor in high plaque index scores on the lingual surface compared to the buccal surface of the tooth being examined. The weakness of this song was in the lyrics "*Jangan lupa sisi dalam gigi!*", which was not elaborated into more detail. Though intellectually disabled children have difficulty to think abstractly, are weak in reasoning, and very difficult in developing ideas, therefore learning material must be concrete and easy to understand.^{17,1} A detailed explanation of the stages of brushing the lingual surface of teeth in this study depends only on the choreography of the song

during the demonstration session. The respondent's learning process on how to brush the lingual surface of the teeth became more difficult without the help of song lyrics.

Verbal material presented as song lyrics will be more efficient to be studied and absorbed by the respondents than material that is only presented verbally without music. Explanation of material in the form of song lyrics will involve the activities of neural networks that are distributed more widely and bilaterally compared to listening to verbal material without music. The material presented in song lyrics also increases the coherence of the frontal electroencephalogram oscillations. Respondents can remember and repeat more words from a song when singing the song than just saying it verbally.¹⁰ The addition of lyrics that are more detailed about the stages of brushing the lingual surface of the tooth is likely able to overcome this problem, but this will increase the duration of the song and require more respondents' ability to memorize the entire lyrics.

Effect of Dental Health Education using Music

The results of this study showed that there was an effect of dental health education using music in decreasing plaque index of mild to moderate intellectually disabled children. Based on the results of the Wilcoxon analysis test, a significant effect can be seen in the first posttest examination conducted after the 3rd day of dental health education using music. This is in line with the results of previous studies that showed the use of music or songs in the education process had a significant influence. The results of the study by Perwidananta (2016) stated that the addition of children's songs had a significant effect in improving the ability to brush teeth independently in mild to moderate intellectually disabled children ($p = 0.001$).¹¹

The effect of music in this study and several other studies that have been mentioned can occur because music has two working mechanisms in affecting the human brain which ultimately have an effect on respondents' condition in general such as cognitive, adaptive, social, and practical functions. The music's mechanism of action in human brain includes neuroendocrine and neural plasticity mechanisms. The neuroendocrine mechanism by activation of the mesocorticolimbic dopaminergic circuit by music can lead to an increase in general arousal and mood, This can ultimately affect one's cognitive performance. Listening to pleasant music can increase dopamine levels, reduce cortisol levels, and activate ventral striatum, nucleus accumbens (NAc), amygdala, insula, hippocampus, hypothalamus, ventral tegmental area (VTA), anterior cingulate, orbitofrontal cortex, and ventral medial prefrontal cortex. This system is simultaneously crucial in mediating passion, emotion, motivation, memory, attention, executive function, and triggering alertness and speed of

processing information. The neuroendocrine mechanism also affects cognitive function in patients who experience cognitive impairment¹⁰, like in intellectually disabled children.

The neural plasticity mechanism includes structural and functional changes in brain circuits. This mechanism works by increasing hippocampal neurogenesis, BDNF levels, TrkB, and modification of GluR2. In contrast to neuroendocrine mechanisms that can be activated by listening to music passively, the neural plasticity mechanism will be activated through active involvement with music such as singing or playing musical instruments.¹⁰ In this mechanism, the brain shows adaptation to music by producing new neurons (neurogenesis) and glia cells, axon growth, increased strength of synaptic connections, influences various forms of semantic processing, memory, attention, motor function, language skills, cognitive function, and can relieve neuropsychiatric symptoms such as agitation, apathy, depression, and anxiety.^{18,19}

Differences in Results based on Sex

The results of Mann-Whitney test showed a significant difference between plaque index of male respondents and female respondents in all examination data. Data from the results of this study indicate decrease in male respondents' plaque index is smaller when compared to female respondents'. Ganns *et al* (2009) stated that the only significant difference in toothbrushing practice between sexes was in the higher brushing force in male respondents.²⁰ Hanasaki *et al* (2018) in their study stated the brushing force of male respondents were 1.5 times greater than female respondents. Several studies have reported a correlation between brushing force with gingival injury or recession, with the prevalence of injury due to tooth brushing having a higher frequency in male than female respondents.²¹ Researchers observed that some male respondents in this study brushed their teeth strongly and quickly before finally complaining of injury and deciding not to complete the practice of toothbrushing after gingival bleeding, this situation did not occur in female respondents and could affect the male respondents' plaque index score.

Different opinions stated by Sadaf D and Ahmad Z (2014), in their study they found a correlation between sex differences with lesions on hard and soft tissues of oral cavity due to toothbrushing was not significant.²² Other factors include brush head sizes, shape of toothbrushes, toothbrush bristles, brushing techniques, and the complexity of each individual's teeth arrangement were claimed to be correlated with the lesions on hard and soft tissues of oral cavity due to toothbrushing and influenced the practice of toothbrushing in cleaning plaque.²² At the beginning of this study, respondents practiced toothbrushing

with medium-bristled toothbrushes and adults' brush head size.

Previous study reported the use of toothbrushes with small head sizes was more effective in cleaning dental plaque. Hard-bristled toothbrushes have better capacity to clean dental plaque better than soft-bristled toothbrushes, but can cause more lesions or soft tissue trauma to the oral cavity than soft-bristled toothbrushes.²³ Risk of tissue injury by medium and hard bristled toothbrushes was reported to be twice as high as soft bristles.¹²

Soft-bristled toothbrushes are rarely associated with trauma, making respondents more comfortable directing it to the gingival sulcus with less pain, gingival lacerations, and cervical abrasion.¹² This became a consideration for researchers to replace the use of toothbrushes that have medium bristles and adults' brush head size in this study with toothbrushes that have smaller brush head size and soft bristles on the 6th day of the study, after observed some male respondents complained of getting injured so they did not complete the practice of toothbrushing after gingival bleeding occurred which could have an impact on the slower decline in male respondents' plaque index compared to female respondents who did not experience similar problems.

Another factor that could be the cause of differences in male and female respondents' plaque index scores in this study is that there are two moderate intellectually disabled respondents who have communication process disorder in male respondents group. This disorder can be in the form of difficulty to articulate the sound of the language correctly and the difficulty in understanding syntactic rules of the language used. Kemis and Rosnawati (2013) suggest that there is a relationship between low intelligence level (IQ) and the speech and language skills possessed by intellectually disabled children.¹ This means communication skills of children with intellectual disability will be different at each level of intelligence. Inequality of respondents' intelligence level resulted in decrease of their plaque index tends to be slower compared to other respondents who did not have communication process disorder. The existence of moderate intellectually disabled respondents in female respondents group was not accompanied by communication process disorder; this led to a significant difference between plaque index data of male respondents and female respondents. If possible, heterogeneity in the form of inequality of ability among respondents which is able to influence research's results was avoided by selecting only one classification group of intellectually disabled respondents.

Differences in Results based on Grade Levels

The results of Kruskal–Wallis test showed no significant differences between plaque index of 7th grade, 8th grade, and 9th grade respondents group on all examination data. According to Kemis and Rosnawati (2013), the ability of intellectually disabled children is different from one another depending on their level of intelligence.¹ Respondents with mild and moderate classification of intellectual disability in this study was spreaded across all grade levels. This caused the difference in plaque index scores between the three groups of grade levels was not significant.

The most prominent differences were found only in the results of posttest 4 and 5, where the 9th grade respondents group had a higher plaque index score than the other two groups due to the presence of two moderate intellectually disabled children with a communication process disorder in 9th grade group. The age differences in grade levels did not have significant influence on the ability of intellectually disabled children to take part in this study.

It can be concluded that dental health education using music as adaptive media in the form of children's songs can affect the decrease in plaque index of mild to moderate intellectually disabled children since the 3rd day. The decrease in male subjects' plaque index was slower than in female subjects. Grade level does not affect the decrease in plaque index of intellectually disabled children. Lingual surface's plaque index had higher score with slower decline than buccal surface.

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